REMARKS

Claims 1-13, 16, 19-21, 26-28, and 41-51 are pending. Claims 24, 25, and 35-40 have been cancelled. Claims 1, 8, 9, 13, 16, 19, and 26 have been amended. Claims 41-51 have been added to cover additional aspects of the invention. No new matter has been introduced. Reexamination and reconsideration of the present application are respectfully requested.

In the July 31, 2003 Office Action, the Examiner allowed claims 26-28. Claims 1-6, and 10-13 were rejected under 35 U.S.C. §102(b) as being anticipated by U.S. Patent No. 4,639,829 to Ostergren et al. ("Ostergren"). Claims 19-21 were rejected under 35 U.S.C. §103(a) as being obvious over Ostergren in view of U.S. Patent No. 5,923,530 to Murayama et al. ("Murayama"). Claims 1-7, 10, 13, and 19-21 were rejected under 35 U.S.C. §102(b) as being anticipated by U.S. Patent No. 6,223,815 to Shibasaki ("Shibasaki"). These rejections are respectfully traversed.

The Examiner objected to claims 8, 9, and 16 as depending from rejected base claims, but stated that they would be allowable if rewritten in independent form incorporating all limitations of their respective base claims. These claims have been rewritten per the Examiner's suggestion and are believed to be allowable.

The present invention is directed to a cooling unit to cool a heat generating component. A heat sink is arranged adjacent to the heat generating component. A heat diffusing member is arranged between the heat generating component and the heat sink. The heat diffusing member is attached to the heat generating component at a set relative position. A first heat conducting member is interposed between the heat generating component and the heat diffusing member to thermally connect the heat

generating component and the heat diffusing member. A second heat conducting member is interposed between the heat diffusing member and the heat sink to thermally connect the heat diffusing member and the heat sink.

Claims 1-6, and 10-13 were rejected under 35 U.S.C. §102(b) as being anticipated by Ostergren. The Examiner stated that Ostergren discloses a cooling unit composed of a sink 27, a heat diffusing member 23, a first heat conducting member 34 interposed between package component 20 and member 23, and a second heat conducting member 33 interposed between member 23 and heat sink 27. The Examiner further state the Ostergren discloses that member 23 in composed of copper and inherently has a higher thermal conductivity than member (grease) 3. The Examiner also stated that member 34 has a higher conductivity than member 33.

Claims 19-21 were rejected under 35 U.S.C. §103(a) as being obvious over Ostergren in view of Murayama. The Examiner noted that Ostergren does not teach or suggest a thermal conduction module is contained in a housing to provide an electronic apparatus. However, the Examiner stated that Murayama discloses a thermal module (heat sink) in Figs. 15-17 and it would have been obvious to one of ordinary skill in the art at the time of the invention to combine the teaching of Ostergren and Murayama in the direction of claims 19-21.

Claims 1-7, 10, 13, and 19-21 were rejected under 35 U.S.C. §102(b) as being anticipated by Shibasaki. The Examiner stated that Shibasaki discloses an electronic apparatus having a housing , a heat sink 27, component 15, heat diffusing member 26, heat conducting member 29, and second heat conducting member 40. The Examiner also stated that member 2 is composed of "A1" and inherently has a thermal

conductivity higher than grease member 40.

Independent claim 1, as amended, recites (with emphasis added):

> 1. A cooling unit to cool a heat generating component, comprising:
> a heat sink arranged adjacent to said heat generating component;
> a heat diffusing member arranged between said heat generating component and said heat sink, **the heat diffusing member being attached to the heat generating component at a set relative position**;
> a first heat conducting member interposed between said heat generating component and said heat diffusing member to thermally connect said heat generating component and said heat diffusing member; and
> a second heat conducting member interposed between said heat diffusing member and said heat sink to thermally connect said heat diffusing member and said heat sink.

Ostergren discloses a cooling unit for cooling a chip. The cooling unit has a heat conductive disk interposed between the chip and a heat sink. The heat conductive disk is thermally connected to the chip through a thermally conductive alloy material and is thermally connected to the heat sink through grease. Accordingly, the heat of the chip is conducted to the heat sink through the heat conductive disk.

The heat conductive disk of Ostergren has a flat base. The base is larger than the chip and is mounted on the back surface of the chip. However, the base of the heat conductive disk only faces the back surface of the chip and lacks a structure for hooking to the chip and being secured. In other words, Ostergren discloses the chip and the heat conductive disk as merely overlapping each other. Accordingly, Ostergren does not disclose, teach, or suggest a cooling unit to cool a heat generating component, the cooling unit having (a) a heat sink arranged adjacent to said heat generating component; and (b) a heat diffusing member arranged between said heat generating component and said heat sink, *the heat diffusing member being attached to the heat generating component at a set relative position.*

According to Ostergren, it is not possible to set a fixed relative position of the

chip and the heat conductive disk. If the chip and the heat conductive disk get out of position, the thermal conductivity of the chip to the heat conductive disk is decreased and the thermal performance of the chip decreases.

By attaching the heat diffusing member to the heat generating component at a set relative position, as specified in independent claim 1, as amended, heat from the heat generating component is conducted to the heat diffusing member efficiently and the thermal performance increases. Therefore, independent claim 1, as amended, distinguishes over Ostergren.

Murayama does not make up for the deficiencies of Ostergren. Murayama discloses an electronic apparatus which includes a circuit module having a heat sink. The circuit module is comprised of a circuit board, a function component, and the heat sink. The circuit board has a number of circuit components and a circuit element which generates heat while operating, the function component is secured to the circuit board by screws. The heat sink is connected to the circuit board by the screws, for radiating heat generated by the circuit element.

However, Murayama does not, alone or in combination with Ostergren, disclose, teach, or suggest a cooling unit to cool a heat generating component, the cooling unit having (a) a heat sink arranged adjacent to said heat generating component; and (b) a heat diffusing member arranged between said heat generating component and said heat sink, *the heat diffusing member being attached to the heat generating component at a set relative position.* Accordingly, independent claim 1, as amended, distinguishes over Murayama, alone or in combination with Ostergren.

Shibasaki discloses a cooling unit having first and second heat sinks. The first

heat sink is thermally connected to the IC chip of a semiconductor package through a heat conducting sheet, and thermally connected to the second heat sink through grease. The heat sink is a flat plate which is approximately the same size as the substrate of the semiconductor package and has a first surface to receive the heat of the IC chip. However, the first surface of the first sink disclosed in Shibasaki only faces the substrate of the semiconductor package as shown in Fig. 2. However, Shibasaki does not, alone or in combination with Murayama and/or Ostergren, disclose, teach, or suggest a cooling unit to cool a heat generating component, the cooling unit having (a) a heat sink arranged adjacent to said heat generating component; and (b) a heat diffusing member arranged between said heat generating component and said heat sink, *the heat diffusing member being attached to the heat generating component at a set relative position.*

Accordingly, independent claim 1, as amended, distinguishes over Sibasaki, alone or in combination with Murayama and/or Ostergren. Claims 2-7, 10-12, 41 and 50 all depend, directly or indirectly, from independent claim 1, as amended, and therefore also distinguish over Sibasaki, alone or in combination with Murayama and/or Ostergren for the same reasons as those set forth above with respect to independent claim 1, as amended. Independent claims 13 and 19, as amended, and new independent claims 48 and 51 each contain limitations similar to those of independent claim 1, as amended, and therefore also distinguish over Sibasaki, alone or in combination with Murayama and/or Ostergren for the same reasons as those set forth above with respect to independent claim 1, as amended. Claims 42 and 43 directly depend from independent claim 13, as amended, and therefore also distinguish over

Sibasaki, alone or in combination with Murayama and/or Ostergren for the same reasons as those set forth above with respect to independent claim 13, as amended. Claims 20, 21, and 44-46 depend, directly or indirectly, from independent claim 19, as amended, and therefore also distinguish over Sibasaki, alone or in combination with Murayama and/or Ostergren for the same reasons as those set forth above with respect to independent claim 19, as amended. Claim 47 directly depends from allowed claim 26 and is therefore believed to be allowable. Claim 49 directly depend from independent claim 48 and therefore also distinguish over Sibasaki, alone or in combination with Murayama and/or Ostergren for the same reasons as those set forth above with respect to independent claim 48.

Accordingly, applicants respectfully submit that the rejections of claims (a) 1-7, and 10-13 and 19-21 under 35 U.S.C. §102(b); and (b) 19-21 under 35 U.S.C. §103(a), should be withdrawn.

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Applicants believe that the foregoing amendments place the application in condition for allowance, and a favorable action is respectfully requested. If for any reason the Examiner finds the application other than in condition for allowance, the Examiner is requested to call either of the undersigned attorneys at the Los Angeles telephone number (213) 488-7100 to discuss the steps necessary for placing the application in condition for allowance should the Examiner believe that such a telephone conference would advance prosecution of the application.

Respectfully submitted,
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